II

RECOLLECTIONS OF A UNIVERSITY PROFESSOR [1]

WHEN I received the invitation to make an address before the students and friends of the Rice Institute, I accepted it at once, partly because I had something which I wished to say. As President Lovett has told you, I am Professor of Physics at the Johns Hopkins University, and as you can see for yourselves, the years of my life are many in number and I am entitled to have recollections. I wished to draw a contrast, and probably a moral, between the state of physics today, its laboratories, its thousands of research workers, its refined theories and vast collection of facts, and its condition when I first approached it. I could tell you of days when there was not a laboratory in this whole country, when the only text-book was a translation of a French one, when, strange to say, men were convinced that ultimate theories of light and electricity had been given, and that what remained was, on the whole, to make measurements. It sounds incredible, but it is true. I thought it would interest you to hear how the change had come about, to have the epoch-making discoveries and concepts accentuated and to be told something of the great personalities of the time. But when I sat down to the preparation of the address, my courage failed me. How could I hope to make clear to an audience such as this in a

[1] Address delivered by Dean Joseph Sweetman Ames, Ph.D., LL.D., of the Johns Hopkins University, at the eleventh commencement convocation of the Rice Institute, Monday morning, June 7, 1926, at nine o'clock.

brief half-hour the mysteries of an atom; how could I speak of electrons, of protons, of quanta, of quantized orbits, of selection principles, etc.? I simply could not do it. So my first address is in the waste basket.

But I had an alternative plan, another line of thought in which I was deeply interested, and so I tried that. It has worked out better, at least to my own way of thinking, and I am going to see if you do not agree with me.

The Johns Hopkins University is about to celebrate the fiftieth anniversary of its foundation, and the occasion is one which inspires serious thought. All the members of the University are busy taking stock. We are studying with care to see what it is today. Our purpose, of course, is to discover the nature of the path we are following, with a view to our future course. But, as we view our own institution, we see it in comparison with others, and are thus led to make certain observations upon our American system of universities as a whole. The observations which I have myself made may be and, I hope, will be of interest to you.

Fifty years ago there were many excellent colleges in this country, institutions where young men could come into contact with good teachers and could receive real intellectual stimulation. There were few opportunities, however, for a student to be led to the point where he himself desired to add to knowledge, and fewer still where, if he so wished, he had the facilities which were essential. Laboratories were unknown and libraries were inadequate. Students were going in considerable numbers to Germany, however, and were returning preaching a new gospel.

The college of those ancient days had little to remind one of the college of today. I think it is fair to say that the great majority of young men who went to college did so with the single purpose of self-improvement, of cultivation

of their intellectual resources. It was a very strange world, as I look back even over forty years. There were no organized athletics, the highly paid coach did not exist; there were no student activities as such. Yet we all played games, of as varied a nature as now. We had our debating clubs and similar organizations. But they were all our own, the college had nothing to do with them. We had never heard the words "college spirit", but we knew what loyalty was. Each individual led his own life, worked more or less studiously, was interested in many things; but the essential feature was that he was an individual and was not conscious of any mass reaction. He was not compelled by public opinion to do anything. A strange world, but an extremely interesting one.

When Daniel Coit Gilman outlined the plans for Johns Hopkins University, he in reality made a revolution in the educational system of this country. I do not mean to imply that other universities followed the path traced by Johns Hopkins; but they were all led to examine their own condition, their opportunities, their responsibilities; and, almost without exception, they introduced changes in their systems. Mr. Gilman's underlying thought was very simple and almost obvious. The college of his day, fifty years ago, offered opportunity to a large number of serious-minded young men to cultivate whatever intellectual equipment they had; but the college did not go far enough. An ambitious student soon reached the end of its resources. Mr. Gilman proposed simply to extend these opportunities. To him there was complete continuity between college and what we now call graduate work; he made no distinction between undergraduate and graduate. There were no formal requirements for admission to his new university. I never knew him to ask a student what he knew or how much he

knew, what he always asked was "what do you wish to know?" The attainment of a degree was an incident, never an end to be aimed at. I have heard him say again and again to groups of students: "I hope you have come, not to obtain a degree, not even to look forward to one, but rather to pursue intensely some line of study and research" For ten years after the University opened there was no formal commencement!

In order to have a university where young men could come in order to develop their powers to the utmost, Mr. Gilman recognized the need of rapidly building up libraries and of equipping laboratories, but first and foremost he knew the necessity of selecting a staff of able professors. He was, perhaps, the first man in this country to recognize the fact that for a man to be a professor of the type he had in mind it was essential that he should be himself an investigator in his chosen field and should be continually contributing to knowledge. Other qualities are essential in a great teacher: personality, power to inspire others, unselfishness; but all these without creative ability are insufficient.

As a consequence of the fruition of Mr. Gilman's ideas, the Johns Hopkins University was opened fifty years ago, and students came in large numbers even the first year. They came not because the institution was heavily endowed or because it was famous, not to obtain a degree; they came because certain distinguished men were there engaged in researches; and they realized that their own longing and determination for self-improvement could best be realized by association with these men. Mr. Gilman knew and the students knew that the University did not, in the end, consist of buildings, libraries and apparatus, but simply was its staff of professors.

I have referred only to Johns Hopkins, but any student of any university in this country in those wonderful Renaissance years would tell the same story. It was a glorious time in which to live. In each laboratory, in each seminary room was a group of men, professors and students, all animated with the same purpose, the attainment of knowledge by one's individual efforts. There was a minimum of lectures and practically an entire absence of formal requirements.

In short, fifty years ago, even forty years ago, there was no sharp demarcation between college and university; there was on the whole a common purpose among all the students; and, further, this purpose was the cultivation of one's individual powers, largely by association with a group of productive, inspiring professors. Years of residence were rather indefinite, the question of progress was an individual matter, degrees, especially higher ones, were matters of secondary importance.

There is a great contrast between these conditions and those existing today. As one looks at any one of our educational institutions, in any part of this country, the first impression is one of size, of vast physical equipment, requiring huge endowments or other sources of income. To me, individually, this feeling is overwhelming. Then, as one examines the system of education, the curricula, the methods of instruction or training, one realizes the existence of a highly complex organization. It appears as if efficiency experts had been employed to systematize a manufactory. To begin with, the college as such is completely divorced from the University or Graduate School. Each has its own life, and each is organized with deans, sub-deans and dozens of officials. The requirements for admission to the college are specified carefully in numbers, the famous fifteen points being as a rule the minimum. What subjects these points

cover really matters little, although some must be found in mathematics and some in English. When a student is matriculated, he again finds himself in the toils of another numerical system; so many points, so many semester-hours, are required before the degree of Bachelor of Arts can be obtained. There are groups of studies, majors and minors, principal subjects, etc., to which attention must be paid; but, towards the end of a student's collegiate career, he almost always has to hunt for a few odd points in order to reach his goal. Many colleges have within the last five years attempted to break their chains, and it is a most striking fact that the students themselves have been the ones who have done most to bring the colleges to realize the needs of the individual and to see the evils of any rigid numerical statement of intellectual growth. I call your attention specially to what the students of Dartmouth and Harvard have done. But in spite of the evidences of this point system, if I were asked what was the most striking difference between the college of today and that even thirty years ago, I would not mention the systematized curriculum, nor the absurd importance attached to organized athletics, nor the growth of interest in so-called student activities, but I would call attention rather to the development of a consciousness of responsibility on the part of the students themselves as a body. This is shown by the rise of student government. A Student Council exists now, in one form or another, in nearly all colleges, and the amount of authority given it is in many cases almost complete. Experience seems to prove that the confidence thus given the students by the college is fully justified. There are, however, two conditions for success; one is for absolute authority to be given, without reservation; the other is that trivial matters be far removed from serious ones.

I think it is fair to say that all American colleges today feel that they are in trouble. This is attributed to many causes. One of these is, of course, the astounding increase in numbers of students seeking to enter college; but there is another which, although less obvious, is, I think, more important. The schools which prepare boys to enter college say, with truth, that with such rigid tests for entrance as now prevail, tests so definitely specified, it is impossible for them to do more than train the boys to pass them; all study is with a purpose, none is for the joy of learning. There is a somewhat similar condition in the college. Many young men are looking forward to studying a profession and therefore are planning to enter a School of Medicine, of Law, or of Engineering. These schools in turn have strict, specified entrance requirements, so many college courses in this or that subject, so that the student is again driven along a narrow path with no opportunity to take courses simply for the pleasure to be derived from them, everything is done for a purpose. Personally, I doubt the educational value of courses whose purpose is so emphasized as to produce the inevitable reaction in the student.

When one looks at our so-called Graduate Schools, it is seen that they, too, are in danger of being organized. The credit system has been introduced into many of them. If a student from a small college wishes after graduation to pursue further study in some university, he may find that his college is not an accredited one and that, therefore, he cannot be admitted to graduate work. Or, if a student wishes to change from one university or another, the first question he asks of the university he wishes to enter is how much credit towards his higher degree he may receive for courses taken elsewhere. The extent to which regulations, formal statements and credits prevail is alarming. The

true function of a university, as a group of productive scholars, is apparently lost sight of both by the university and by students.

Another striking feature of the modern college and university is, as I said before, the vastness of their equipment: dormitories, lecture halls, laboratories, libraries, gymnasiums and, last of all, these days, stadiums. No institution is complete without a million-dollar coliseum. Many of these are gifts, some have maintenance funds; but all are evidences of the new student life. The salaries of professors are rising slowly, although not in proportion to the demand made upon them. Fifty years ago the maximum salary paid a professor was five thousand dollars; today one of ten thousand is not unknown. The whole upkeep of a university is therefore alarmingly great. This is shown in the rise of tuition fees. In my first years in college I paid seventy-five dollars a year; today four hundred dollars is the rule. But even this does not represent the cost of a student to a college or university. This ranges from five hundred and fifty dollars a year to twelve hundred or more, depending upon the character of work he is doing. This is a serious situation for an endowed institution.

Again, it is interesting to note the growth of the scholarship and fellowship system in every university in the land. Thousands of these are given. When one sees the effect of all the endowed scholarships in theological schools and notes the absence of such in law schools and medical schools, it seems strange that universities have not drawn an obvious conclusion. There is a widespread belief on the part of the public and even more on that of the student that there is peculiar merit obtained by paying the expenses of a man in college and in the university. When one contrasts the results of higher educational institutions in Europe, their

type of scholar, with that of our highly subsidized university, it is clear that we have not yet discovered the method of developing talent. The truth is, as every one knows, that the great majority of graduate students are not men of exceptional talent. They are, however, as a rule serious-minded, earnest and hard working.

I have drawn what I believe is a fair picture of the college and university as they exist today. Both are highly organized, both are crowded with students; the courses leading to degrees are strictly defined; individuality has little opportunity to develop. Forms and standards prevail. Again, the importance of the professor as such is not recognized as it was, either by the university or by the students. Regardless of the talent of the professor, he is given various executive duties to perform, he is overwhelmed by students who require help constantly. A student planning for advanced work does not, as a rule, consider the individual professors of a university, but rather the university itself, its endowment, its laboratories, its reputation for placing its graduates.

If I were to contrast in a few words the university of fifty years ago and that of today I would say that in the former there was no system of instruction, both professor and student had great opportunity to learn and to add to knowledge, the professors were the university; in the latter there is organization and not freedom and individuality, the students are on the whole candidates for degrees not searchers after truth.

I cannot pretend to think the present university is as fine an institution as it was; but I think its development has been inevitable. The question whether it must continue its growth along the same lines is, however, a different matter. It is not without interest in this connection to note

a few of the influences which have brought about the changes noted.

The most serious change, to my mind, is the practice of stating requirements and attainments in mathematical figures; so many points for admission to college; so many semester hours for the Bachelor's degree; so many credits for the Master's degree; etc. This is absurd on the face of it, and Harvard and a few other universities have rebelled against the system, and at least a hundred colleges are seeking to make use of so-called "honors courses" in some way, thus minimizing the point system. The introduction of this mode of marking educational progress is due, to a degree, to the difficulty the Carnegie Foundation for the Advancement of Teaching found in administering its pension fund. Its trustees had to define a college and a university, and, in so doing, to specify standards for admission to college and standards for graduation from college. Part of their definitions was expressed in points; and, inasmuch as every college in the country wished to be on the accredited list of the Foundation, the requirements both for admission and for graduation were everywhere slowly made to conform to the standards of the Foundation. The Foundation may well be proud of the effect of its regulations in raising the standards throughout America. The results have been epoch-making. But when once introduced into the educational institutions of the country, this numerical system proved so useful in so many ways that it became firmly established and grew and was extended in all directions, even into the Graduate School. The truth is that college officers could administer such a system so easily and with a minimum of mental exercise. Did a fitting school provide fifteen points of instruction, well and good; its graduates were possible candidates for admission; otherwise not.

Those colleges which admitted on certificate had a definite answer to give. Again, if a student in college had collected one hundred and twenty-five points, say, he could receive his Bachelor's degree under ordinary circumstances, otherwise not. It was all so simple. It is no wonder that the system was so universally adopted. But its evils have become so manifest that nearly every college is seeking ways to break away from it.

It is bad enough to have this type of standardization in the fitting school and in the college; in the university it is an abomination. In a graduate school there should be a minimum of regulation, practically no formal requirements. A student should be guided by his professor, should be allowed to develop what powers he has under the advice and with the guidance of the professor. Requirements as to subordinate subjects should be erased from the university rules. If a professor cannot be trusted to give sound advice, surely no general academic rules will help. Time will prove, and prove quickly, whether the students of a particular professor bring credit to the university. If they do not, students will cease to come to him; and the difficulty solves itself. Freedom of thought and action for both professor and student is what is essential.

The second cause of the change in the university is the absurd importance attached to the degree of Doctor of Philosophy, as such, by college presidents and by many directors of laboratories. There is a definite money value associated with a degree, regardless of the qualifications of the individual. I know many colleges where no man can hope to be a professor unless he "has his degree". I know a laboratory where the scale of salaries is based practically upon the status as to degrees, a maximum of so much unless the man has a Master's degree, then a different and higher

maximum until the Doctor's degree is obtained. The money value of a higher degree leads, naturally, many men to enroll as graduate students whose aim is simply to attain the Doctor's degree. They see no further. These men are in many cases excellent students, but their purpose in life is not a search for truth, not a dedication to intellectual study and investigation. They form a group quite distinct from the type of student that came to the old university. Naturally they have altered the entire nature of the university. As a rule they like lecture courses and they like to have facts given them. Further, their problems for investigation must practically always be assigned to them, and their progress must be guided. Again I say these men are most satisfactory students, but they rarely have any opportunity after leaving the university of continuing their investigations and of bringing renown to their professors. It may be argued, and I think justly, that these men whose primary aim is to obtain a degree are greatly benefited by their university experience, and that therefore there is good reason for the university providing for them and welcoming them. All that I wish to emphasize is that this is not the primary duty of a university and that it was not for them that the first universities were opened.

In this same group should be included the part-time student, the man who also serves as an assistant or instructor, or who devotes part of his time to pursuits outside the university. In some universities with which I am familiar the majority of the graduate students are of this type. As a rule they are the best students in the university, considered simply as students. But a man cannot serve two masters. It is my experience that, if a man is to make the progress he should in any investigation, he must have his mind on this and on nothing else. He must be thinking of his problem

even when he is asleep. No part-time student can do this. He is in the university to stay, however; but his presence is a comparatively recent introduction, characteristic of our present condition, not of the early days.

A third cause of the change in universities is to be found in the intense competition of business life. A student in college, as his graduation day approaches, looks out into the world. If he is timid or lacking in self-confidence, what he sees does not attract him, he is terrified. Then he turns his eyes to the graduate school and sees a country of peace and beauty, a country he can enter without any break in his path, where he will feel at home. Is it any wonder that he selects this career, specially if he is subsidized to do so? This condition certainly prevails, and every university professor knows the effect of having such students under his care. Moreover it is definitely a condition that did not exist fifty years ago. I doubt if any university would be justified in rejecting such students, but it would be inexcusable if a professor did not neglect them.

A fourth influence upon both colleges and universities is the overwhelming increase in the number of students, good, bad, and indifferent, who are applying for admission. There are many reasons for this, many good reasons as well as bad ones; but the fact itself is all that need be emphasized. The result is near-bankruptcy for the institution, despair on the part of the faculty and meagre gain by the student. Every one recognizes the fact that this condition cannot continue, and each university must find its own solution of the difficulty.

To a man not an American the most salient features of our educational system are the number of years required for a man to complete his professional training and the fact that all men practically require the same number of years.

Our fitting schools have completed their fifteen points—and no more, when a boy is on the average eighteen; four years more are required in college; then three or four more are passed in the graduate, law, or medical school. The Doctor of Philosophy or professional man in America has, on the average, spent eighteen years in some kind of school. To gain what? Surely not his real education, that is only beginning. There is an appalling loss of time somewhere. I beg to call your attention to the fact that the United States is the only country among the great nations of the world which has the institution we call a college, it is the only nation which permits two complete dislocations in its educational system—school to college, college to university. The fitting schools of England, of France, of Germany, of all the European countries, large and small, send their students to the university having about the status of our Junior Class, no pitiable fifteen points for them. When these students enter the university they immediately start upon their life work, or they play. At any rate they have the opportunity for the former. Furthermore, having entered the university, they progress as rapidly or as slowly as they wish, individuality has free scope, requirements and conformity to the pace of others are not enforced. If one asks which is the better system as such, my answer is "look at the results". To me the outstanding advantage of the European system is that young men finish their preparation for life earlier; they are then free, free to expand, to develop their own powers, to test their own theories. This freedom is the first requisite for the development of an original mind, and it should come as early as possible.

It is not to be expected that this European system will ever be adopted in this country; too many changes are involved. The fitting schools and high schools would be

obliged to extend their courses for at least one year, and, what is more important, would have to change their curriculum and by some process induce their students to accept an education. Then the college as we know it would have to disappear and be merged in the university. I doubt if the alumni of any of our firmly established colleges would look with favor upon such a change; and every one knows how powerless university authorities are in the face of alumni opposition. There is, however, one comparatively new element in our educational system which may be of great importance in the situation. This is the junior college. Its graduates may now enter, with a few exceptions, any law school, medical school, or engineering school in the country. Surely some of these men will wish, instead, to continue their pursuit of academic subjects, and they will look around to see where they can find opportunities to do so. They will not be willing to enter an ordinary college; they will wish to concentrate all their energies in some chosen field. They are in reality true graduate students. Some provision must be made for them in universities; and this fact will surely introduce a serious change in the university. I anticipate that this condition will arise very shortly. When it does, we shall also see clever students in good fitting schools demand that their school curriculum be extended and be made more intensive, so that they may be put on the same footing as the graduates from the junior college. When this occurs, and it certainly will, we shall have a definite improvement in our educational policy.

In the meantime there is one university in this country which has recognized the defects in our present system, and has made the changes necessary to meet the situation. I am proud to say that this is Johns Hopkins University. The trustees of this institution have formally adopted the plan

proposed by President Goodnow, which also has the unanimous approval of the faculties and the sincere support of the alumni and students. Beginning with October, 1926, any student who can convince the professors in any subject that he is serious-minded and is properly prepared for work in this field will be admitted as a candidate for a higher degree. There are no stated requirements for admission, no formalities. It will be a personal matter between the student and the professors. After the student is admitted, the same condition will prevail. All university requirements as such have been wiped off the register; the student and his professors must work out their own salvation. Time alone will show the results; but one thing is perfectly evident, the brilliant student will not be hampered in any way, he should make a rapid progress and soon become himself an independent, self-reliant, productive scholar. We members of the faculty of Johns Hopkins are looking forward to happy years.

I cannot but believe that other universities will be forced by circumstances to modify their systems along somewhat similar lines, not to adopt the same method of meeting the situation, but some method. No other university in the country has the unique advantages of Johns Hopkins with reference to its trustees and its alumni; it can do what the others may wish to do but cannot. But, in any case, the situation everywhere is encouraging. Many of the present evils are recognized as such and remedies are being applied. Systems as such are being discarded, individuality on the part of the young man in college is being recognized and encouraged. The essential need by industry and the country at large of young men whose native talent has been developed so that they have the desire and the ability to solve new problems is felt intensely. The universities are

conscious of a new life stirring. I am confident, therefore, that the university professor who fifty years from now tells you something of his recollections will have a real story of forward progress to relate.

JOSEPH SWEETMAN AMES.


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